THE

AMERICAN REVIEW OF TUBERCULOSIS
ABSTRACTS OF TUBERCULOSIS

VOLUME XXIII JANUARY, 1931 ABST. NO. 1

CONTENTS

	PAGES
Treatment (*concluded*)	1–8
Surgical (collapse therapy) (concluded)	1–2
Specific	2–3
Light	3–4
Chemotherapy	4–6
Dietetic	6–8
Diseases Other than Tuberculosis	8–14
Miscellaneous, Epidemiology, Control	14–24

Contralateral Lung in Artificial Pneumothorax. The gravity of pulmonary tuberculosis should stimulate us to use in as large a proportion of patients as possible the sole active therapy which has proved its effectiveness. Unilaterality of lesions still remains the ideal indication for therapeutic pneumothorax. But it is well to consider the exceptions to this rule. The determination, in the course of bilateral tuberculosis, of spontaneous improvement in the lung opposite an artificial pneumothorax should suggest extension of its indications to certain cases that otherwise would not receive its benefits. We are not now speaking of cases in which the presence of a lesion in the other lung was doubtful but of those in which the lung was clearly affected, clinically and roentgenographically. There is also the possibility of a resort to double collapse therapy, and recent reports from the public sanatoria of Leysin show that this should not be considered an exceptional method. It is true that spontaneous amelioration of the disease in the contralateral lung appears at first glance paradoxical, since it is subjected to a compensatory hyperactivity. Some have attributed the benefits to active hyperaemia, others to diminished general toxaemia following exclusion of the collapsed lung, still others to hyperventilation. Sanatorium conditions appear to be a *sine qua non* in obtaining these good effects. In general, complete rest under favorable hygienic conditions leads rapidly to a remission, as evidenced by both constitutional and local manifestations. The perifocal inflammation subsides, and serial roentgenographs show the changes clearly by lessened opacity, less cloudiness, more sharply defined limitation, and arrangement of opacities parallel to interstitial tissue. When the patient is sufficiently detoxicated, and after several successive films at short intervals have shown these changes, is the time to try collapse therapy on the more diseased side. It is futile to await a new active process, which may be fatal or spread new foci and transform relatively benign bilateral disease into grave bilateral disease. If one can secure a total pleural separation the progressive collapse of the more diseased lung cannot injure the opposing one or prevent its improvement,—quite the reverse. However, the pneumothorax must be very carefully executed, without suddenness or intemperate refills. The patient should be under strict bed care and "taking the cure." It is well known that the effectiveness of a pneumothorax does not depend solely on the degree

of collapse, and that a negative pressure does not inhibit the retractility of the diseased parenchyma. If one can obtain a selective collapse, allowing the expansion of healthy areas, a part of the respiratory function is preserved and the opposite lung is less overburdened. There are also cases in which unilateral collapse therapy appears clearly to favor regression in the already involved opposite lung. Suppose a patient, with bilateral lesions, unequal in gravity and extent, in which the simple sanatorium cure has effected no essential change. Should one wait? In such cases too long expectant treatment carries more risks than advantages. The more diseased side should be collapsed. After its exclusion it is not uncommon to see progressive amelioration in the less affected lung. Again, suppose a patient with originally unilateral lesions. After a few weeks' observation and lowering of the temperature, with general improvement, roentgenography shows an active process appearing on the opposite side, possibly accompanied by no clinical signs. Formerly such an extension would have constituted a contraindication to collapse therapy and the patient would have been abandoned to his fate. Now it is deemed justifiable to institute collapse in such a case. One will have to keep in mind the possibility that a double collapse may become necessary, but if the patient is fortunate it may be avoided. Double collapse is to be thought of when, after collapse of the more severely involved lung, amelioration of the process in the other lung fails to occur. Three typical cases are cited, one of each of the foregoing groups. In the first case, the contralateral lesions were cavitation but localized to the apex, in the second less extensive but located in the middle of the right lung field, in the third especially marked in the right lower lobe but also involving the upper. In the first case the retrogression of the right pulmonary lesion, with progression of the left, forced intervention. In the second, the stationary condition of both lesions made one undertake collapse of the worse lung, while in the third the appearance of fresh lesions in a hitherto healthy lung led to induction of pneumothorax on the other more gravely diseased side. *Double Pneumothorax:* Rarely should a simultaneous double pneumothorax be instituted. Which side, then, should be collapsed first? Certain authors think that most recently involved. Morin and Bouessée, however, are convinced that the lung most extensively and severely infected should first be treated, in order to prevent dissemination of new foci and promote detoxication. A case reported by Bernard and Salomon in 1920 is cited. This patient had extensive excavated lesions on the left. On the right, more discrete apical lesions were present, with bullous râles and, in X-ray films, cloudy areas and diffuse shadows along the ascending trunks from the hilum. The patient developed a spontaneous left pneumothorax with exudate, which was artificially continued. The signs and roentgenographic findings on the right disappeared, also the bacillary sputum. It is added that spontaneous regression of a pulmonary lesion does not rule out tuberculosis as its cause. One must not of course exaggerate the indications for collapse therapy. The encouraging results here reported seem dependent on two factors: (1) keeping the patients in a sanatorium under the most favorable conditions and (2) recent improvements in technique. Small, rather closely-spaced refills are advised, avoiding mediastinal displacement, reducing pleurisies and favoring normal retractility. A selective pneumothorax, properly carried out, should be sought when possible, and maintained by frequent fluoroscopic control, before and after refills. Numerous excellent roentgenographic reproductions accompany the paper.—*Effet bilatéral du pneumothorax thérapeutique unilatéral, J. Morin and F. Bouessée, Rev. d. l. Tuberc., April, 1929, x, 184.*—(*A. P.*)

Axillary Temperature in Artificial Pneumothorax.—In a clinically successful artificial pneumothorax, the axillary temperature on the side of the collapsed lung is lower than on the sound side. A rise in this temperature often indicates the onset of a pleural complication.—*La temperatura biascellare nel pneumotorace terapeutico, Dr. Chinchini, Tubercolosi, May, 1928, xx, 182.*—(*U. E. Z.*)

Friedmann's Vaccine.—The renewed interest in Friedmann's vaccine recalls an instance observed of a man who had been treated ten years ago by this method. He had fallen ill ten years previously, had an haemoptysis, and was from a tuberculous family. He recovered remarkably in six months, but after a year fell ill with influenza. At that time he had cough, expectoration, and showed signs of disease in the lungs. He was treated with Friedmann's vaccine and he gradually improved. In 1929 (nothing of the interval) he developed pleurisy, had tubercle bacilli in the sputum, and showed much disease in the lungs with marked displacement of the mediastinum from adhesions. It is interesting that the same physician who originally treated this patient with the vaccine has admitted that the patient has experienced no "Cure".—

Kasuisticher Beitrag zur Behandlung der Lungentuberkulose nach Friedmann, Schelenz, Deutsche med. Wchnschr., March 14, 1930, lvi, 439.—(H. S. W.)

Friedmann's Vaccine.—The court hearing for a patient on Friedmann's "cure" for tuberculosis recalls the fact that Friedmann's claims for cure rest upon very inadequate experimentation with very few animals.—*Die Patentierung des Friedmannschen Tuberkulosemittels, F. Neufeld, Deutsche med. Wchnschr., February 21, 1930, lvi, 320.—(H. S. W.)*

Propaganda for Friedmann's Tuberculin.—In tuberculosis circles in Germany there has been a revival of propaganda for the treatment advocated by Friedmann with his turtle-bacillus vaccine. The advertising is featured by many claims that are based on inadequate evidence.—*Und nochmals die Propaganda für das Friedmannsche Tuberculosemittel, J. Schwalbe, Deutsche med. Wchnschr., December 6, 1929, lv, 2066.—(H. S. W.)*

Heliotherapy and Pulmonary Tuberculosis.—André discusses a report made by Roussel to the First International Light Congress at Lausanne in September, 1928, which is full of material and thoroughly scientific, bearing on the statistics, indications and results of heliotherapy in the different forms of pleuropulmonary tuberculosis. His conclusions recognize that the results are less brilliant than in cases of surgical tuberculosis and that among the pulmonary tuberculous cases it is the least grave who benefit most, such as cases of mediastinal lymph-node tuberculosis, pleural and corticopleural forms, those with discrete infiltrations, and most cases of closed tuberculosis. The fibrous forms, even with ulceration, may receive sun treatment; in acute active forms it is absolutely contraindicated. In pneumothorax and its complications it acts favorably and even in laryngeal localization, but its largest success is when used preventively combined with open air in children who would ordinarily develop the tuberculosis of the next generation. Of the patients admitted by Hervé to the *Sanatorium des Escaldes* 83 per cent received heliotherapy, which seems a large number, especially when it is considered that 75 per cent arrived with excavated lesions. One cannot help thinking that other special climatic advantages played a part here, certain imponderable elements which acted favorably in assisting heliotherapy. None of the reports from Switzerland or Germany are more encouraging than this, some much less so. In Belgium its indications have to be more strictly limited because luminosity is almost always associated with considerable warmth which has the initial effect of causing dangerous pulmonary congestion, hence modified aerotherapy is preferred by André. The patient's clothing is entirely removed when weather conditions permit but he remains in the shade of a tent which protects against direct irradiation. At the Sanatorium d'Obourg the construction is so arranged that this method can be ideally applied.—*Héliothérapie et tuberculose pleuropulmonaire, J. André, Rev. Belge d. l. Tuberc., January–February, 1929, xx, 21—(A. P.)*

Light Clinics at Tuberculosis Dispensaries.—The county of Lancaster was divided by the Joint Tuberculosis Council of England and Wales into five large dispensary areas for the treatment of nonpulmonary forms of tuberculosis by light. The most suitable lamps were found to be two long-flame carbon-arc lamps for general treatment, one quartz-mercury-vapor lamp for general or local treatment, and one Kromayer water-cooled lamp for local treatment. *Summary and Conclusions: 1:* Artificial light treatment gives excellent results in patients with tuberculosis of the skin and tuberculous adenitis with abscess formation and skin involvement. These conditions are slow to yield to other forms of treatment. *2:* In this series of 726 cases 73 per cent were able to continue their normal occupations during treatment. *3:* In 45 of 68 skin cases the disease became quiescent and apparently cured. The average duration of the disease prior to treatment was thirteen years and six months, whereas the average duration of light treatment was seven and three-quarters months. Several photographs are shown illustrating the favorable effects of light therapy. *4:* In the entire series of 726 cases, 190 were quiescent and apparently cured. The average gain in weight was 3 pounds in adults and 3.2 pounds in children. Six and one-half months was the average duration of light therapy, a period considerably shorter than required by other methods of treatment. *5:* The cost of these dispensary light clinics was considerably less than had these patients been treated at a hospital. *6:* Greater use of light clinics is advocated.—*Light Clinics at Tuberculosis Dispensaries, G. L. Cox, Brit. J. Tuberc., January, 1930, xxiv, 1.—(J. G.)*

Light Treatment of Tuberculosis.—Many theories have been advanced to account for the successful results derived from light therapy, but as yet no experimental proof has been obtained to explain the

reaction of the tissues following its application. It is believed that in the absorption of ultraviolet rays of wave-length shorter than 3,300 A. U. there are produced photochemical substances which cause an increase in the bactericidal power of the blood, primarily at the site of irradiation and later in the general circulation. The long ultraviolet rays from 4,000 to 3,300 A. U. have no therapeutic effect. The pioneer work of Bernhard and Rollier in Switzerland is briefly described. Their greatest triumphs have been obtained in surgical tuberculosis, especially in children. Tuberculosis of the bones and joints, peritoneum, and lymph nodes responds well to this form of therapy. Cases of lupus and extensive ulcerative scrofuloderma are also favorably influenced. Heliotherapy often disappoints those who do not give it enough time and attention. Frequently failures are due to faulty technique. Since 1913 at the Finsen Light Institute Reyn and Ernst have used carbon-arc and quartz-mercury-vapor lamps. They noted a more marked improvement in those patients receiving a strong erythema dose with desquamation but with slight pigmentation. Rollier's technique was modified, as they believed that pigmentation was a hindrance to the effect of light on the organism. The most important contraindications to ray therapy are advanced heart disease, fever with toxaemia, and extreme nervous irritability. Rollier states that patients with renal insufficiency are not benefited by light therapy. Haemoptysis should not be a deterring factor when dosage and technique are carefully regulated. Among the signs of excessive exposure are severe constitutional reactions, fever, exhaustion and general fatigue. The effects of radiation may be summed up as due to (1) the absorption of products of photobiochemical reactions, (2) the results of counterirritation and hyperaemia, and (3) changes in endocrine and vitamin metabolism. Lamps suitable for ray therapy may be classified according to the wave-lengths they emit: those producing short ultraviolet rays and causing rapid erythema, and those producing long ultraviolet rays and causing slow erythema. The technique used depends on whether the whole or only small areas of the body are exposed. The skin reaction may be so controlled to yield suberythema, erythema or pigmentation doses. The author prefers the shorter rays with intermittent skin exposures to avoid any pigmentation, although one cannot dogmatise as to the best source of light in any specific case. The beneficial effects of light therapy can be greatly enhanced when combined with aerotherapy. Although there are no specific laboratory tests to determine the effects of irradiation, the methods available, such as the bactericidal power of the blood, the sedimentation and complement-fixation tests, may guide us as to the progress when associated with the clinical evidence at our disposal.—*Radiation Therapy in Tuberculous Disease. A. Eidinow, Brit. J. Tuberc., January, 1930, xxiv, 18.*—(*J. G.*)

Treatment of Pulmonary Tuberculosis with Sanocrysin.—One hundred and forty-two cases were under treatment. The thiosulphate of gold has a definite action on tuberculous pulmonary lesions. Its effect is most noticeable in active febrile cases. In this type of patient it caused an arrest in the activity of the disease in 43 per cent. In the same group an arrest occurred by spontaneous evolution in 5 per cent. Definite improvement was also noted by X-ray. Jeanselme treated 32 cases of lupus erythematosis with the gold salt and reports twenty clinical cures.—*Le traitement de la tuberculose pulmonaire par la sanocrysine, Bernard and Mayer, meeting Acad. de Médecine, March 19, 1929, reported in Progr. Méd., April 6, 1929, no. 14, 610.*—(*U. E. Z.*)

Treatment of Tuberculosis with Sanocrysin.—The use of sanocrysin represents real progress in the treatment of tuberculosis. Although not a specific in the sense that it cures the disease, it has proved itself to be distinctly helpful in some cases. It is impossible to choose the cases that will be amenable to sanocrysin treatment and it is also impossible to adequately explain the exact mechanism involved in patients showing improvement under its use. The anatomical type of lesion is no criterion for which type is best suited for the treatment. Sanocrysin may be tried when all other measures have failed. Small doses of the drug are safer than the larger doses.—*Ulteriore contributo allo studio della chemoterapia della tubercolosi polmonare, F. Giuffrida, Tubercolosi, May, 1928, xx, 170.*—(*U. E. Z.*)

Calcium Inhalations in Pulmonary Tuberculosis.—By means of pulverizers and nebulizers, 30 patients were treated with inhalation of a saturated solution of calcium lactate. In 5 cases there was no improvement; the lesions remained stationary. Twenty-five showed improvement with definite gain in weight. Haemoptysis was always checked under this form of therapy. Thoracic pain, cough, dyspnoea and expectoration were improved. No ill effects were noted. In all cases the number of tubercle bacilli in the sputum was diminished or absent. Radiological improvement par-

alleled the clinical findings. In 3 cases the roentgenograms showed definite deposition of calcium in the lung. The results obtained are explained by the fact that the calcium is absorbed directly by the respiratory tree and exerts a remineralizing effect. The method used offers no inconveniences. The infiltrative, monolateral and sclerosing lesions are best suited to this form of therapy. Some cases with tendency to haemoptyses are also suitable.—*Le inalazioni di calcio nella terapia della tubercolosi polmonare, G. C. Antognoli, Tubercolosi, June, 1928, xx, 209.*—(*U. E. Z.*)

Treatment of Tuberculosis by Benzene Derivatives of Copper and Didymium.—Five elements have attracted attention by their chemotherapeutic action on tuberculosis: Copper, iodine, rare earths, and hydrocarbons of the benzol and benzene series. Calmette, in his recent book, reviews the work with copper and the results obtained. Sulphates, acetates, oleates, albuminates, sulphocyanides, chlorides, lecithins, and potassium-tartrate combinations, have all been used. Cyanocuprol, a solution of potassium cyanide and copper, which has an excellent sclerosing action, leads in guinea pigs to loss of weight and sometimes dry gangrene of the extremities. Iodine, according to some, acts particularly in the paratuberculoses, as certain mycoses and saprophytic infections; however, in certain cases it is also an important antituberculous agent. The rare earths *in vitro* affect the Koch bacillus unfavorably in very weak dilutions but in pulmonary tuberculosis more often have disastrous effects, at least in the chemical forms employed. Cherbuliez, professor of chemistry at the University of Geneva, has sought to obtain a combination soluble in oil in which all the elements considered useful would be associated. One of these was the diiodosalicylic aldehyde of copper and didymium, which, combined with the benzene factor, is soluble in fat but not in water. The following compounds were tried: (1) benzoate of copper in oily solution, (2) cupric derivative of diiodosalicylic aldehyde in oily solution, (3) benzoate of copper with didymium in oily solution, (4) didymium derivative of diiodosalicylic aldehyde in oily solution, (5) cupric and didymic derivative of diiodosalicylic aldehyde, and (6) aqueous emulsion of the foregoing. *Determination of Dosage:* Parchet, of the Institute of Clinical Chemistry of Lausanne, found that intramuscular injection of 10 gm. per kg. was constantly fatal, which led to the adoption of 0.5 to 1 gm. per kg. every two to twelve days, this causing no ill effects. *First Experiments:* A series of 5 guinea pigs, tuberculized by subcutaneous injection of 0.5 gm. triturated organs from tuberculous guinea pigs, served as control to 2 groups of 5 guinea pigs likewise tuberculized and treated, the first by oily benzoate of copper, the other by oily cupric derivative of diiodosalicylic aldehyde. At the end of two and a half months when killed, the untreated had become rapidly cachectic, whereas the treated remained in excellent general condition and their primary lesions healed rapidly. Their organic lesions were less destructive and contained much fewer bacilli and these showed fragmentation not observed on the controls. The experiments were then repeated, allowing the animals to die themselves. The controls died in 5, 6, 14 and 16 weeks, and one only in 6½ months. The treated showed one death from pneumonia at 3 weeks and one from operative trauma; the others lived 6, 8 and 10 months. If one counts the 3 longest survivors of the two groups, there is a total of 13½ months for controls and 24½ months for the treated. In a third series there were four treated groups of 5 animals each, using (1) oily benzoate of copper, with didymic derivative of diiodosalicylic aldehyde, (2) the same in colloidal suspension, (3) oily mixture of cupric and didymic derivatives of diiodosalicylic aldehyde, and (4) the same in colloidal suspension. The treated groups showed mean survival periods of 9 months, 8½ months, 8 months and 6½ months; the untreated 5½ months, and the same differences in appearance and lesions were noted. With the oily products weight was maintained better. Cherbuliez and Reb carried out independently at the Hygienic Institute of Geneva studies on groups of guinea pigs tuberculized by injection of cultures of bacilli into the thigh and similarly treated, beginning a week later. Excepting the group treated with cupric and didymic derivatives of diiodosalicylic aldehyde in oil, there was no advantage over the controls in survival. *Clinical Experiments:* Stephani began these in September, 1926, and up to March, 1928, had treated 108 tuberculous persons, of whom 97 were pulmonary, with organic preparations of copper and didymium. Oily preparations were found much more satisfactory than aqueous. For over a year no accident occurred, but later some severe general reactions were observed and two fatalities, with phenomena of acute pulmonary oedema. The improved or cured totalled 71 per cent, all of whom had previously failed to improve. In 50 per cent of febrile cases the temperature became normal. Weight was gained in 60 per cent, tubercle bacilli disappeared in 22 per cent. The Arneth formula and the sedimentation test

were less markedly influenced. However, good results were maintained in nearly 90 per cent, while reactions, such as elevation of temperature, bloody sputum, vertigo, and sometimes pulmonary oedema, occurred in 20 per cent, being severe in 5.5 per cent and fatal in 2 per cent. *Conclusions:* Benzoate of copper, associated with a benzene derivative of didymium and given subcutaneously in oily form, exerts undeniable effects in guinea pig and human tuberculosis. Its evolution is favorably influenced in 71 per cent of difficult cases. Serious reactions occur in about 5 per cent, and death has ensued in 2 per cent. Further refinement of the medicament and better selection of cases may diminish these dangers.—*Essai de traitement de la tuberculose pulmonaire par les dérivés benzéniques du cuivre et du didyme, T. Stephani, Rev. d. l. Tuberc., December, 1928, ix, 898.*—(*A. P.*)

Salt-Free Diet in Treatment of Tuberculosis.—The Sauerbruch-Herrmannsdorfer salt-free diet has been under study, but it could not be studied as extensively as was desirable because of the objection of patients who often refused to be subjected to the disagreeable features of the scheme. The results were as follows: (1) a slight increase in weight was noted, but this might have been attained in other ways; (2) improvement in the pulmonary condition was not observed in any instance; (3) the courses of visceral and orthopaedic tuberculosis were not changed; (4) the sedimentation rate of red blood cells was hastened in most cases, which became normal when the treatment was discontinued; (5) the percentage of blood chlorides was unchanged; (6) the hydrogen-ion concentration of the urine remained unchanged. In 5 cases among those treated (only a comparatively few) the condition in the lungs became definitely worse. This was attributed to a nonspecific alimentary irritation. Such a diet may exert a baneful influence upon physiological and pathological processes in the body. The diet recommended certainly is not to be advised in tuberculosis.—*Zur Behandlung der Lungentuberkulose mit kochsalzfreier Diät, Harms & Grünewald, Deutsche med. Wchnschr., February 14, 1930, lvi, 261.*—(*H. S. W.*)

Salt-Free Diet in Treatment of Tuberculosis.—The Gerson-Herrmannsdorfer scheme of salt-free diet, rich in vegetables, vitamins, fats and mineral salts and poor in carbohydrates has had quite a vogue in the treatment of tuberculosis. The increase of mineral salts is a conspicuous feature. Phosphorus added to codliver oil is also an essential part of the treatment. Phosphorus hastens absorption from the intestinal tract. When fairly large doses of this product combined with codliver oil are given for two or three weeks, serious mental consequences, especially a marked apathy, may develop. Fatal poisoning is infrequent but does occur. Phosphorated codliver oil used in large doses over a long time is distinctly dangerous and its use is to be warned against. Codliver oil and phosphorus aid and play a valuable rôle in the treatment of tuberculosis when used properly.—*Phosphorlebertran und die Gerson-Herrmannsdorfersche Diät zur Heilung der Tuberkulose, Deutsche med. Wchnschr., December 6, 1929, lv, 2050.*—(*H. S. W.*)

Salt-free Diet in Treatment of Tuberculosis.—The use of a salt-free diet in the treatment of tuberculosis has not only been found to be a failure therapeutically but a distinct danger. There is a great tendency on the part of patients to hold to new and relatively untried remedies and cast aside known and tried methods. Special clinics have been set up for treatment of tuberculosis by this worthless method.—*Zur Behandlung der Lungentuberkulose und der Tuberkulose anderer Organe mit kochsalzfreier Diät, G. Apitz, Deutsche med. Wchnschr., November 15, 1929, lv, 1918.*—(*H. S. W.*)

Insulin in Tuberculosis.—A comprehensive review of the literature reveals marked difference of opinion as to the therapeutic effect of insulin given to fatten tuberculosis patients without diabetes. While the majority have reported that tuberculosis is favorably influenced by insulin, certain writers, notably Blum, have laid emphasis on the fact that this form of therapy may be harmful. For further study of this question a series of 32 nondiabetic tuberculosis cases was treated with insulin and observed for periods varying from several months to several years. The subjects chosen did not have very active disease, and were for the most part afebrile. All had had stationary weight for at least two months and had received no other form of therapy than the routine rest cure. Careful observations were made of body-weight, temperature, pulse, blood-pressure, and amount of urine. All patients were followed three to six months after treatment and the pulmonary lesions regularly reviewed. Injections were made fifteen minutes before the two principal meals of the day. While the diet was not modified, it was supplemented by 3 gm. of sugar for each unit of insulin. Treatment was always suspended during menstruation. *Results:* Following a single course of treatment 25 of 32 patients showed a gain in weight (more than 2 kg. in one case, from 1 to 2 kg. in 13

cases, and less than 1 kg. in 11 cases). The results varied with the dose injected. Thus, where 15 units a day failed to produce appreciable gain in 14 or even 25 days, doses of 30 units brought about a sharp increase. Sixty units a day proved less satisfactory and was often poorly tolerated. Of the 25 showing gain in weight, 6 maintained it, 5 maintained it partially, and 6 rapidly fell back to their former weight. Eight continued to gain after the cessation of treatment, and appeared definitely benefitted, not only by weight increase, but by improvement of the appetite and general condition. Of 21 cases who received a second course of insulin there was an increase in weight in fifteen. The best and most permanent results were again obtained with doses of 30 units a day. Four patients received 3 courses of insulin and one received four. In one case each course produced a gain in weight which was maintained. *Incidents during Treatment:* Several cases developed urticaria following the resumption of treatment after several months' interval. In one case there occurred haemoptysis, epistaxis, and haematuria, with extension of the pulmonary disease and death after a few months. In 16 of 32 cases there was slight and, in most instances, transitory elevation of temperature between the sixth and tenth days of treatment. Sputum lightly tinted with blood was observed frequently during the injections, and in one instance there was a frank haemoptysis. In 7 cases there was reactivation of the pulmonary disease. Hypotension was noted in most cases, with a lowering of systolic pressure of 1 to 5 cm. and a rapid return to normal after the treatment was discontinued. Impurities in the insulin were not considered as causative factors in producing the above symptoms. *Conclusions: 1:* Insulin should not be given routinely to all tuberculosis patients. It should not be given to those with active disease, nor to those with unstable temperature, hypotension, or a tendency to haemoptysis. *2:* Doses of 30 units a day are sufficient, and doses of 45 or 60 units a day are useless and even dangerous. It is also unwise to give too many courses and to make any one course longer than 15 days to 3 weeks. *3:* Close supervision is necessary and treatment should be stopped at once if the least indication occurs. *4:* In stable cases insulin generally brings about an increase in weight and a remarkable feeling of well-being, but even in such cases it may cause severe reactivation of the disease.—*La cure insulinique d'engraissement dans la tuberculose pulmonaire, F. Combemale, C. Gernez and A. Breton, Ann. d. Méd., December, 1929, xxvi, 480.*—(*E. H. K.*)

Psittacosis.—Seventeen cases, three of which died, are reported in detail. Sixteen cases gave histories of contact with sick birds. The other case had contact only with healthy pigeons. Of the sick birds, 10 were parrots and one was a love-bird. All of these birds died. The 10 parrots were responsible for 14 human cases, and the love-bird for two. The symptoms of the sick birds were as follows: stupor, diarrhoea, hyperpnoea, nasal discharge, shedding of feathers, and vomiting. The incubation period in man seems to approximate that of the typhoid group. The general clinical picture of the 17 cases was as follows: rather sudden onset; continuous hyperpyrexia, rising rapidly and falling by lysis; relatively slow pulse; intense headache, usually occipital; slight cervical rigidity; occasional severe sweating, and early diarrhoea and vomiting; and later, marked tympanites. Epistaxis and palpable spleen were rare. No "rose spots" were found. Nervous symptoms, such as stupor, mask-like facies, exaggerated and even pathological tendon reflexes, incontinence, disorientation as to time and place, and mild delirium occurred in varying degree in 5 cases. The outstanding clinical feature was the lung involvement. At the onset signs of slight shifting bronchitis appeared, followed in a few days by signs of extensive consolidation. Later the percussion note was flat and breath-sounds were absent, though pleural effusion was not demonstrated. These signs sometimes persisted for several days after the temperature had fallen and the general condition had improved. Then resolution occurred very rapidly and completely, accompanied by fine crepitant râles. Cough was frequent but never painful, expectoration was scanty or absent, and "rusty" sputum was rare. Respiration was easy, and never hurried unless the lung involvement was extensive. Pleural friction was found once. Although the clinical picture in most of the cases was fairly characteristic, the symptoms occasionally were slight and equivocal, even in fatal cases, and the diagnosis then rested on the history of contact with sick birds. One case came to necropsy. The changes in the lungs were those of a pneumonia of an unusual type, and did not resemble those found in lobar pneumonia, in ordinary bronchopneumonia, or in septic pneumonia complicating a septicaemia due to infection by any of the pyogenic organisms. The condition of the spleen, however, suggested that a septicaemia was present. There was no lesion to suggest typhoid fever or other acute enteric infection. The diagnosis was that death was caused by pneumonia and septicaemia and that the findings were compatible

with the clinical diagnosis of psittacosis. The blood-serum of 6 of 8 cases was positive for agglutination of *B. psittacosis*. Blood cultures done in 6 cases were sterile. Two positive Widal reactions were found among the 10 cases tested. Two patients (not tested for Widal reactions) received prophylactic injections of typhoid-paratyphoid vaccine. Both subsequently exhibited severe systemic reactions. One case received no definite benefit, but apparently the illness of the other was shortened. Four cases received intramuscular injections, at intervals of 1 to 3 days, of blood-serum (amounts not stated) from apparently healthy persons who had from 1 week to 3 months previously received prophylactic doses of typhoid-paratyphoid vaccine. Favorable results, such as fall in temperature and general improvement, were obtained in 3 cases. The serum's value seemed to be in direct proportion to the length of time elapsed between the giving of the vaccine and the drawing and use of the serum. Neither *B. psittacosis* nor any similar organism was recovered from patients or birds, but an organism identical with *B. psittacosis* and salmonella (mutton) was isolated from the cages of 3 parrots responsible for 3 cases of human psittacosis, one of which was fatal. *Conclusions:* Serious illness in man may be due to contact with sick parrots and lovebirds, and occasionally with healthy birds. The means of transmission remains obscure. The predominance of the parrot as the agent of infection justifies the retention of the term "psittacosis" for the present. It is probable that similar types of infection, hitherto unrecognized, have prevailed in England.—*Psittacosis. A Further Account of Cases of Human Infection, A. P. Thomson and W. T. Hillier, Lancet, February 22, 1930, ccxviii, 396.*—*(R. M. F.)*

Psittacosis.—Six of twelve parrots which were investigated had been responsible for human psittacosis. Evidence of the presence of a filtrable virus was sought and found in three of the six. In each case the filtrate of an organ suspension produced a fatal disease in budgerigars, and one of these strains was carried to the third generation, filtered material being employed throughout. Chamberland-Li candles and the Seitz E. K. filter were used, and in every instance their efficiency in arresting the passage of bacteria was controlled. Control budgerigars inoculated with unfiltered parrot's or budgerigar's organs which had been heated to 100°C. for 20 minutes remained well. In none of these 6 parrots was any member of the salmonella group isolated. Five of the remaining 6 parrots, which, though ill, had not been responsible for human disease, were also negative for this group. The sixth yielded *B. aertrycke*. The clinical picture of this parrot's disease was identical with that of the other parrots having psittacosis, but the postmortem findings were entirely different. This is cited as evidence that *B. aertrycke* is not the aetiological agent of psittacosis. Budgerigars were inoculated with material from 8 cases of human psittacosis, and in every case disease was produced in the birds. Citrated blood was used in 6 cases, blood-serum in one, and pleural exudate in one. Control birds were inoculated with normal human citrated blood. Three cases are described as evidence of infection of humans by contact with a diseased parrot, a diseased human, and a parrot carrier. The possible relationship between this virus and the virus of fowl plague is still under investigation.—*Further Observations on the Etiology of Psittacosis, S. P. Bedson, G. T. Western and S. Levy Simpson, Lancet, February 15, 1930, ccxviii, 345.*—*(R. M. F.)*

Psittacosis.—Eight cases of an influenza-typhoid-like illness, which proved fatal in one instance, occurred in the same block of flats. All were associated with a diseased parrot, which had exhibited no symptoms other than rhinitis and dyspnoea prior to death. The incidence and severity of the disease apparently had no definite relationship to the degree or duration of exposure to the diseased parrot. Four persons having direct contact with the parrot remained well. A ninth case, which was fatal, had contact with parrots and budgerigars, some of which were diseased and died. The noteworthy clinical features of this series were the prevalence of early epistaxis, the tendency toward diarrhoea and collapse, and the special liability to pulmonary complications toward the end of the first week. Age appeared to be a factor in prognosis, in that the severest illness occurred in patients over 30 years of age. From the enteric group psittacosis is differentiated by its more abrupt onset, negative blood culture in the early days, the absence of an agglutination reaction in the second week, and the rarity in typhoid of severe pulmonary complications. In differentiating between influenza and psittacosis, early epistaxis or delirium should tentatively exclude influenza, while the early appearance of signs of pulmonary disease favors a diagnosis of influenza. In generalized tuberculosis the onset is less acute, the pulse is more rapid in proportion to the temperature, and the toxaemia is less evident than in psittacosis. The 9 cases reported suggest an incubation period for psittacosis of less than ten days. In both of the fatal cases the striking

postmortem findings were in the lungs. They exhibited extensive fibrinous pleurisy and small subpleural haemorrhages, but no free pleural fluid. Gray to reddish-gray areas of consolidation of varying size were present throughout the lungs. These areas showed no evidence of purulent exudation or necrosis upon gross examination. There was much gelatinous oedema. The bronchial lymph nodes were swollen and firm in one case. The spleens were slightly enlarged, but not softened. The other viscera showed cloudy swelling and congestion. In one case there was a recent intramuscular haemorrhage in the abdominal wall, and the caecum showed 4 small, shallow, acute ulcers, without peritonitis. Microscopic study of the lungs indicated that the chief condition was a bronchopneumonia, with small foci of necrosis in the consolidated areas. In one case there were seen thrombosed vessels, both isolated and associated with necrotic areas suggestive of infarcts. The study of the cases hitherto reported under the name of psittacosis, together with these here recorded, leads to the tentative conclusion that there is a septicaemic form of disease in human beings closely associated in aetiology with disease in parrots and kindred birds. This conclusion is confirmed by the clinical features and the anatomical findings in the disease, and by the evidence of contact with sick and dead parrots.—*Psittacosis. A Record of Nine Cases, with Special Reference to the Morbid Anatomy in Two of Them, T. Horder and A. E. Gow, Lancet, March 1, 1930, ccxviii, 442.*—(*R. M. F.*)

Aetiology of Psittacosis —Twelve human cases diagnosed as psittacosis and six parrots connected with these cases failed to yield evidence, either bacteriological or serological, of the presence of any organism of the salmonella group, of which Nocard's bacillus is a member. Using the budgerigar as an experimental animal, a filterable virus was demonstrated in the organs of a parrot. The parrot tissues were still virulent after being kept for twenty days in 50 per cent glycerol saline solution in the cold. The findings suggest that this filterable virus is the cause of psittacosis in man.—*Observations on the Aetiology of Psittacosis, S. P. Bedson, G. T. Western and S. L. Simpson, Lancet, February 1, 1930, ccxviii, 235.*—(*E. H. K.*)

Anaerobic Streptothrix in Sputum.—An anaerobe resembling somewhat the *Cohnistreptothrix israeli* was isolated from the sputa of cases suffering from tuberculosis, chronic bronchitis, bronchiectasis and asthma. Two thousand sputa from 1,000 patients were examined. From 118 of these with active tuberculosis 172 sputa were examined. The streptothrix was demonstrated in every case. In the sputa from other diseases the anaerobe was present in 65 per cent of the cases. Marked deviation of complement was obtained by using a suspension of this anaerobe as antigen. A vaccine prepared from this organism was used in cases of tuberculosis, chronic bronchitis and bronchiectasis sometimes associated with asthma with favorable results.—*Note on an Anaerobic Streptothrix Occurring in Sputa in Pulmonary Diseases, E. T. Thompson, Lancet, November 16, 1929, ccxvii, 1036.*—(*F. G. P.*)

Massive Collapse of Lung.—No very accurate statement can be made as to the frequency of massive collapse of the lung, because it is often overlooked by those who are unfamiliar with the clinical picture and by those whose attention is concentrated on the underlying condition. Furthermore, it may be followed by inflammatory complications which confuse the diagnosis. Physical signs may be conveniently described in three stages. In the early stage there is very marked immobility of the affected side, weakness or even absolute extinction of breath-sounds, and extraordinary displacement of the heart and abdominal viscera. In the second stage breath-sounds become markedly tubular. Later, abundant crepitations and râles appear. Symptoms are extremely variable and may be entirely absent. Dyspnoea of varying degrees of urgency may be present, and in the later stage there may be cough and expectoration. The situation of massive collapse is generally in the basal portions of the lungs. Perhaps the seat of election is the upper part of the middle third of the lower lobe, but it may involve the whole of one lung. The most striking feature of its course is the rapidity with which the physical signs change, the whole course at times being run in thirty-six hours. Inflammatory complications, such as pleurisy or bronchopneumonia, may occur. Diagnosis may be especially difficult in cases of massive collapse appearing on the side opposite to a comparatively trivial injury. On the left side it is easy to make an erroneous diagnosis of spontaneous pneumothorax because of the transmission of gastric tympany with extreme elevation of the diaphragm. The complexity of its aetiology suggests that there are several varieties of massive collapse. The cases first described by Pearson Irvine about fifty years ago were dependent on palsy, as diphtheritic paralysis. Another large group included cases in which many factors (anaesthetics, operations, posture)

came into play. Some have thought that the condition was especially associated with operative procedures in the upper portion of the abdomen. Military cases, especially when penetrating and nonpenetrating wounds causing obstruction by haemoptysis are excluded, are singularly instructive, since obviously some other mechanism than a purely mechanical or paralytic one must be invoked. It has been shown that there exists the most extraordinarily complex relationship between the volume of the lung and the tonus of the chest-wall. The slightest diminution of the volume of the lung by sucking a small quantity of air out of the trachea produces, reflexly and immediately, an increase in the tonic contraction of the diaphragm and of the inspiratory muscles. Conversely, slight raising of the pressure will produce an immediate expiratory tonus. It is thus seen that apart from the mechanical relationship existing between the volume of the lung and the volume of the chest there is a very delicate and complicated reflex nervous mechanism between the two. It seems probable that a mechanism of this sort must be responsible for those cases of massive collapse that occur on the side opposite to a slight injury. It is difficult to conceive of any primary mechanism of bronchial obstruction, since all varieties of this condition produce symptoms, and it is unlikely that a degree of bronchial obstruction sufficient to lead to the collapse of a whole lung could occur without distress. Assuming that immobility of one side of the chest may be brought about reflexly, it is not difficult to understand collapse of the lung, since it is known that if the bronchial tree is obstructed, the rate of absorption of the air of the lung is very rapid.—*Hunterian Lecture on Massive Collapse of the Lung, J. R. Bradford, Lancet, February 15, 1930, ccxviii, 331.*—(*E. H. K.*)

Pulmonary Abscess and Interlobar Pleurisy.—Examination of a patient 65 years old revealed the presence of an abscess in the right upper lobe. Roentgenograms showed the presence of a shadow situated at the lower border of the abscess and in the region of the interlobar fissure. Its lower border was convex and extended into the pulmonary parenchyma. Paracentesis in the region of the upper lobe was done and streptococcic pus was withdrawn. Another paracentesis was done at the level of the interlobar fissure and an aseptic serofibrinous fluid was removed. One week later the patient died of apoplexy following another paracentesis. The autopsy findings were those of lung abscess and interlobar pleurisy. The interlobar pleura acts as a favorable barrier to the downward or upward spread of a pulmonary suppurating lesion.—*Abcès streptococcique du poumon droit accompagné d'une pleurésie séro-fibrineuse et aseptique, Tixier, meeting Soc. Méd. des Hôp., January 11, 1929, reported in Prog. Méd., January 26, 1929, no. 4, 171.*—(*U. E. Z.*)

Interlobar Pulmonary Abscess.—The surgeon should radiographically localize the abscess. After rib resection and pleuropulmonary fixation, the delimited lung tissue should be incised. If pus does not flow at once, a drain is inserted and spontaneous evacuation will occur within 24 hours.—*Abcès pulmonaires interlobaires, Lefort, meeting Soc. de Chirurgie, April 10, 1929, reported in Prog. Méd., April 20, 1929, no. 16, 700.*—(*U. E. Z.*)

Adhesive Mediastinitis with Bronchiectasis.—Rist and his associates have described the occurrence of mediastinal pleurisy in cases of bronchiectasis. In the present article a case with autopsy findings is recorded. A female, aged 44, entered the hospital with a history of recurrent winter coughs for twenty years. On admission she showed typical symptoms of cardiac decompensation and renal insufficiency. Cyanosis and dyspnoea were very marked. Her sputum was 100 gm. daily, and on examination showed many pneumococci and streptococci and a few encapsulated gram-negative diplobacilli. Tubercle bacilli were never found. The X-ray revealed a homogeneous shadow from the right apex to the subclavicular area. There was no evidence of cavity. On each side of the spine, there were irregular diffuse shadows extending from the hilum down to the diaphragm. After 44 days of hospitalization, despite the use of digitalis and various diuretics, the patient died of cardiac failure. The lungs on section showed a diffuse adhesive pleuritis of the right lung. The bronchi of the right upper lobe contained many cylindrical and bead-like dilatations. The superior vena cava and left innominate vein were imbedded in a group of densely adherent lymphatic nodes. Microscopically, the mediastinal tissues showed the presence of a nonspecific chronic inflammatory process. It is believed that this patient had from infancy a chronic bronchitis which later developed into bronchiectasis, associated with pleuropulmonary fibrosis and mediastinal pleuritis of the affected side. The exact aetiology of the entire process remains obscure. Postmortem study of the lungs excluded tuberculosis. Although the blood Wassermann was slightly positive, histologically the pulmonary lesion was not of syphilitic nature.—

Mediastinite au cours d'une dilatation bronchique associée a une symphyse pleurale, D. Olmer, J. Berthier and G. Zuccoli, Arch. Méd-Chir. d. l'Appar. Respir., September, 1929, iv, 398.—(J. G.)

Pulmonary Asbestosis.—Asbestos is a silicate occurring in minerals. In the manufacture of asbestos products, dust, consisting of fine asbestos fibres, is generated, and sets up a characteristic pneumonoconiosis in the workers. Murray reported the first fatal case on record in 1900. In 1927 McDonald reported the finding of asbestosis in lungs postmortem. In 1929, by using antiformin, Stewart and Haddow demonstrated the bodies in the sputum. Also, in 1929, Gloyne showed that the central core of the asbestos body is an asbestos fibre. The authors have seen 37 cases of pulmonary asbestosis, 15 of which were reported by Wood in 1929. Of these 15 cases, 3 are dead. The cardinal symptoms are dyspnoea and cough. Dyspnoea comes early, causing the worker to discard his respirator, and later becomes severe. Cough is seldom marked and is nonproductive, or may be accompanied by a little viscid, mucoid sputum, which rarely may be blood-streaked. Other symptoms are anorexia, lassitude, chest pains, and loss of weight, often extreme. The skin is of a leaden hue, and may be cyanosed. The chest is poorly covered, expansion is restricted, and the vital capacity is reduced. Slight clubbing of the fingers is often apparent. Asbestos corns appear in the skin of exposed parts. The physical signs in the lungs are those of bilateral fibrosis and are limited to, or predominant in, the bases. As the fibrosis is bilateral, cardiac displacement is seldom appreciable. The technique for demonstrating asbestos fibres in the sputum is given. The fibres are markedly refractile. The bodies are golden-yellow, vary in length from 24 to 60 micra and in breadth from 12 to 24 micra. Usually one end is bulbous, the body is segmented, and the other end tapers. The bodies' substance is homogeneous, except for a central linear thickening, which is the asbestos fibre. The nature of the yellow substance is obscure. The bodies do not stain with ordinary aniline dyes, but can be faintly stained with the prussian-blue reaction for detecting iron in histological sections. The characteristic X-ray picture of an advanced uncomplicated case is a diffuse haze, resembling ground-glass, distributed over the lower lung fields. Closer inspection reveals areas of fine mottling and linear shadows. The costal angles are obliterated. The lateral margins of the lungs show thickening of the parietal pleura, and the dome of the diaphragm is obscured. Thickening and puckering of the apical pleura may be apparent. The descending root shadows are exaggerated. Once the asbestosis bodies appear in the sputum the course of the disease seems progressively downward. Cessation of exposure to asbestos dust then does not check the spread, and death ensues from bronchopneumonia or tuberculosis. The sputum should always be examined for tubercle bacilli. Symptomatic treatment is disappointing. Prophylaxis is all important. Postmortem examination reveals uniform thickening of the visceral pleura with varying degrees of pleural and pericardial adhesion. Both lungs are usually involved. They are firm and contracted, with diminished air-content. On section the trabeculae stand out in a fibrous network. There is evidence of septic bronchitis, bronchopneumonia, or lobar pneumonia, as terminal events. Bronchiectasis is present. Fibrosis usually extends into the apices. Obliterating layers of fibrous tissue surround the bronchioles, which show desquamation of epithelium with replacement by granulation tissue. There may be cellular infiltration of the peribronchial tissues. The pulmonary end-arteries are surrounded by fibrous tissue and show thrombosis. The interlobar and subpleural connective tissue is thickened. Some alveoli are obliterated by fibrous tissue, others are emphysematous, and still others are filled with leucocytes and alveolar cells. Occasional giant cells, not to be mistaken for tubercle giant cells, are found. Amorphous brown pigment, often phagocytized by alveolar cells, is scattered throughout the lungs. Asbestosis bodies are found in the lumina of the bronchioles, in the alveoli, and in the fibrous tissue. They may be phagocytized. Three stages of pulmonary asbestosis are defined, as follows: (1) the presence of asbestos fibres in the mouth and nose, indicating exposure but not necessarily disease; (2) the presence of asbestosis bodies in the sputum, which indicates tissue response to the dust; and (3) the typical signs, symptoms, and X-ray appearance, which are clear evidence of the disease. The relation of pulmonary tuberculosis is not clear, but when it occurs in these cases it is likely to be of an anomalous type.—*Pulmonary Asbestosis, W. B. Wood and S. R. Gloyne, Lancet, March 1, 1930, ccxviii, 445.—(R. M. F.)*

Tuberculosis Complicating Diabetes.—A diabetic suffering from pulmonary tuberculosis received pneumothorax and insulin therapy for four years with good clinical results. Following the first instillation of air the patient had a severe febrile reaction

and lapsed into a comatose state. He recovered rapidly with heavy doses of insulin. The results obtained in this case are the exception rather than the rule. In many cases the use of insulin aggravated the pulmonary lesion.—*Diabète compliqué de tuberculose, pneumothorax et insuline, meeting Soc. Méd. des Hôp., January 18, 1929, reported in Prog. Méd., February 2, 1929, no. 5, 199.*—(*U. E. Z.*)

Spontaneous Pneumoperitoneum.—Cases of pneumoperitoneum during the course of artificial pneumothorax are quite rare. A case is described in a girl of 23 years who had, in addition to her pulmonary symptoms, anorexia, abdominal pain and intermittent attacks of nausea and vomiting. Eight days after admission artificial pneumothorax was induced on the right side. The first 20 refills yielded only a small pocket of air and terminal pressures were about zero. Then, in an effort to obtain a more effective collapse, another site of an injection was sought in the lower posterior axillary line. During this refill the initial and final pressure readings were slightly positive. Roentgenological examination showed a layer of air between the liver and diaphragm. The gastrointestinal symptoms persisted until oxygen was substituted for air, and then soon subsided. The pneumoperitoneum was continued for two months. It is believed that the patient had a tuberculous peritonitis which improved with oxygen insufflations. The subdiaphragmatic pocket of air remained constant and never changed in size and shape, as though it were localized by adhesions. It is assumed that air reached the subdiaphragmatic space by escaping through the hiatus between the oesophagus and aorta and that this case is one of spontaneous pneumoperitoneum.—*Pneumoperitoine au cours d'un pneumothorax artificiel, T. Stephani, J. Stephani and H. Desboeuf, Arch. Med-Chir d. l'Appar. Respir., September, 1929, iv, 404.*—(*J. G.*)

Measles and Tuberculosis.—Tuberculosis has no demonstrable effect on the course of measles. The literature contains many references to the fact that an attack of measles may aggravate or precipitate an attack of tuberculosis. Some patients, previously in good health, may develop acute tuberculosis, with any of its manifestations and complications, following measles. In the authors' service, of 459 children with measles, 33 (7.18 per cent) had positive skin-tests to tuberculin at a given time in the course of their measles. Only 4 of these had any evidence of tuberculosis prior to entering the hospital. In tuberculous children who contract measles, the prognosis is very grave. If they escape an aggravation of their tuberculosis due to measles, they often succumb to the common variety of bronchopneumonia. Of 459 children with measles, only 15 (3.48 per cent) have really been shown to have been infected shortly after the measles. Actual statistics thus show such cases to be relatively infrequent. In only 62 per cent of patients dying of tuberculous meningitis was measles found to have occurred a short time previously. In measles patients presenting pulmonary complications the diagnosis between acute pulmonary tuberculosis and ordinary bronchopneumonia is quite difficult. The authors agree with Hutinel that a sudden rise in temperature several days after the defervescence of the measles has occurred should arouse suspicion of tuberculosis. This occurred in four of their cases. Measles is a condition prone to produce anergy. At the time of invasion and during the eruption the tuberculin skin-test becomes negative. The time of reappearance of the positive test varies greatly. A positive tuberculin skin-test does not establish the tuberculous nature of a complication of measles. An attack of measles apparently deprives the skin of its ability to react to tuberculin. For proper differential diagnosis, careful clinical observation, laboratory examinations, repeated skin-tests, X-ray examinations, search for tubercle bacilli, the serological tests of Vernes and Besredka should all be performed; otherwise the tuberculous infection may be overlooked or wrongly incriminated.—*Rougeole et tuberculose, P. Nobécourt, R. Liège and A. Herr, Arch. d. Méd. d. Enf., February, 1930, xxxiii, 65.*—(*P. J. W.*)

Avian Tubercle Bacillus as Cause of Hodgkin's Disease.—A previous study of two cases of Hodgkin's disease indicated the avian tubercle bacillus as the probable aetiological factor. The present report confirms these findings. The material for study consisted of the organs from a fatal case of Hodgkin's disease in a female child of eight years. This previously healthy child of normal parents had had a routine tonsillectomy, and one month later developed a low fever (to 102°F.) and progressive loss of weight, vomiting and epistaxis. The lymph nodes in the neck became enlarged, and continued to increase in size for four months. A diagnosis of Hodgkin's disease was then made by biopsy. The spleen later was found to be enlarged and palpable, and a roentgenogram of the chest showed enlarged mediastinal lymph nodes. The child died eight months after the onset of the disease, and the autopsy showed a hypertrophied spleen and masses of

enlarged lymph nodes. There was almost a continuous chain of nodes extending along the vertebral column, about the aorta, through the diaphragm, around the pylorus, and along the upper edge of the pancreas. Microscopic examination of these nodes revealed the histological picture of typical Hodgkin's disease. Emulsified material from certain nodes was inoculated into two "treated" guinea pigs, two normal chickens and one rabbit. The "treated" guinea pigs had been given a previous injection of killed human tubercle bacilli. One of the guinea pigs died fifty days after inoculation with an atypical tuberculosis, involving practically all the lymph nodes. Cultures on egg media from these nodes gave a moist pinkish growth of *non-acid-fast tiny granules*. This culture, when inoculated into another "treated" guinea pig, produced, after five months, extensive tuberculosis of liver, spleen and lymph nodes. The second of the original "treated" guinea pigs survived one hundred and forty days, and the autopsy showed a massive tuberculous involvement of the lymph nodes, with focal granulomata in the lungs and extensive necrosis of liver and spleen. Histologically the nodes revealed the peculiar myeloid giant cells, endothelial cells and fibrosis, considered characteristic of Hodgkin's nodes. Cultures from the nodes on egg media developed a pure growth of acid-fast bacilli, with many of the cultural features of the avian type of tubercle bacillus. This organism, on reinoculation, produced similar lesions in other guinea pigs and from them the same strain was isolated. The rabbit inoculated subcutaneously with the original lymph-node emulsion was still alive (nine months after injection). It is a well-known fact that rabbits are frequently insusceptible to subcutaneous inoculations with pure cultures of avian tubercle bacilli. Of the inoculated chickens, one was killed five and one-half months after injection and gave evidence of early avian tuberculosis, as shown by the focal areas of necrosis in the liver, the hyperplastic cervical nodes, and the small subperitoneal tubercles along the large intestine. Cultures from these lesions on egg media developed a scant moist pure growth of acid-fast bacilli. Material from the liver lesion in this fowl was inoculated into two other chickens. One of these lived five months and at autopsy showed advanced tuberculosis of the liver, spleen and lymph nodes. Emulsified lymph-node material from this chicken was inoculated into a third series consisting of four young chickens. Two of these died in three months with extensive tuberculosis of the bones, liver and spleen. The fate of the second of the original group of two chickens is not given. *Summary: 1:* Chicken inoculations of Hodgkin's material again resulted in typical avian tuberculosis and reinoculation from this into other chickens caused a more extensive tuberculosis with marked involvement of bones. Cultures of material from one of the latter group gave a pure growth of tubercle bacilli, culturally of the avian type. *2:* "Treated" guinea pigs inoculated with the original material developed extensive lymphatic tuberculosis and cultures on egg media showed many of the characteristics of avian tubercle bacilli. *3:* Subcutaneous inoculation of a rabbit with the original material caused no infection, as frequently happens even with pure culture of avian tubercle bacilli.—*Study of a Case of Hodgkin's Disease in a Child, E. S. L'Esperance, J. Immunol., February, 1930, xviii, 127.*—(*J. S. W.*)

Pel Ebstein's Syndrome Due to Tuberculosis.—In the further study of the experimental inoculation of chickens with Hodgkin's nodes, a case of Hodgkin's disease with the Murchinson-Pel-Ebstein's syndrome is reported. This clinical type of Hodgkin's disease is a rare form, in which gradual splenic enlargement and intermittent attacks of pyrexia, lasting for two weeks or longer, are the most prominent features, the associated lymph-node involvement being either absent or insignificant. This peculiar syndrome was first described by Murchinson in 1871. Pel, in 1885, reported three similar cases as pseudoleukaemia. This was followed in 1887 with a detailed report by Ebstein of a new infectious disease. The present patient was a young male, 25 years of age, from the British West Indies. The family history was negative. During childhood he had pneumonia and malaria, the latter persisting for four years until he was fifteen. After this he was apparently healthy until one and one-half years before admission to the Memorial Hospital, when he noticed in the left side of his neck an enlarged node which did not seem to increase in size. For two and one-half months preceding his admission he had recurring attacks of chills, followed by fever, ranging between 98° and 104°F., and general weakness. These attacks appeared at intervals of about ten days or two weeks, and during this time the man lost 17 lbs. The left cervical nodes were slightly enlarged but discrete. Also small nodes were present in axilla and groin and the spleen was felt four finger-breadths below the ribs. The blood count was not distinctive. A roentgenogram showed enlarged lymph nodes at the root of the lungs. The further course of the disease is not reported. The pathological findings obtained

at autopsy were as follows: (1) granuloma malignum of the spleen; (2) old pleurisy (left side); (3) subacute pneumonia in the right side; (4) slight granulomatous hyperplasia of thoracic and abdominal nodes. The spleen presented numerous small areas of focal necrosis with haemorrhages over the whole organ. Microscopically, there was very little cellular reaction of the type of Hodgkin's granuloma or any other granuloma, but a few rather typical myeloid giant cells were seen. The lungs showed marked congestion and a peculiar interstitial pneumonia. No typical granulomatous lesions of Hodgkin's type were found. The bone-marrow in a lumbar vertebra showed an almost diffuse deposit of granulomatous tissue resembling that found in the spleen. The study of this case suggests a very atypical form of Hodgkin's disease, mainly in the spleen, with the lesion consisting almost entirely of focal necrosis. Direct smears from the spleen stained by Ziehl-Neelsen's method showed a few acid-fast bacilli, and cultures from splenic tissue on egg media gave a scant moist growth resembling that of the avian tubercle bacillus. To determine more exactly the nature of the organism present, fresh macerated splenic tissue was inoculated into 4 chickens intravenously,one rabbit intravenously, and one rabbit subcutaneously; and into four guinea pigs, two previously "treated" (with killed human tubercle bacilli) and two normal ones. The chickens were also fed the remaining splenic pulp. Of the 4 chickens, 1 was accidentally killed four months after injection, and showed early tuberculous lesions in liver, spleen and nodes, and what appeared to be tuberculous pericarditis. Acid-fast granules were found in stained sections, but no cultures were made. A second chicken lived six months, and at autopsy showed extensive tuberculosis of liver and spleen with typical Sternberg histology. Acid-fast bacilli were found in direct smears and in stained sections of tissues. Cultures from the spleen on egg media showed a growth of acid-fast organisms similar to that obtained in the original splenic material. The rabbit inoculated intravenously (no. 313) died twenty days after injection with a focal necrosis in the liver suggesting tuberculosis. Cultures from these liver nodules on Dorset egg medium showed a moist growth of acid-fast bacilli with many of the cultural characteristics of the avian type. Macerated tissue from an enlarged inguinal node from rabbit 313 was inoculated intravenously into rabbit 99. This animal survived 22 days, and autopsy revealed an acute septicaemia characteristic of certain types of avian infection in mammals with foci in liver and spleen, and a thick purulent (cheesy) pleurisy. The mesenteric lymph nodes were large and firm. Cultures from the cheesy material on Dorset egg medium gave a moist growth of small acid-fast bacilli. The rabbit inoculated subcutaneously lived for six months, and at autopsy showed typical generalized tuberculosis. No cultures were made. Of the 4 inoculated "treated" guinea pigs, one died 11 months after injection with extensive lymph-node tuberculosis, slight involvement of the lungs, and a single focus in the liver. The remaining guinea pigs were alive three hundred and seventy-two days after inoculation. *Summary:* The bacteriological study of the present cases has resulted in the isolation of an acid-fast bacillus which possesses many of the cultural characteristics of the avian tubercle bacillus and the following pathogenic properties which characterize that microörganism: *1:* It infects the chicken, producing lesions typical of avian infection. *2:* Injected intravenously into rabbits it produces an "acute septicaemia," as in avian infection in that animal. *3:* Injected subcutaneously into rabbits it produces a local lesion from which a generalized infection follows slowly. *4:* It is practically nonpathogenic for untreated guinea pigs, but may be pathogenic for guinea pigs treated with killed human tubercle bacilli, with lesions predominantly involving the lymphatic system. The above findings are valuable, first, as offering evidence of the avian tuberculous nature of a disease which presents a histological relationship to Hodgkin's disease, and, second, in indicating that in the human being, as well as in the lower animals, especially birds, avian infection may be exhibited in various pathological lesions.—*A Case of Pel Ebstein's Syndrome of Tuberculous Origin, Elise S. L'Esperance, J. Immunol., February, 1930, xviii, 133.—(J. S. W.)*

Research in Tuberculosis.—Through the coöperation of a number of widely separated laboratories, each equipped to attack a special phase of the problem, there is at present being carried out a study of the chemical analysis of bacteria and the physiological effects of the chemical fractions into which the bacteria may be split. Bacteria being so studied include the human tubercle bacillus H37, the bovine, avian, nonspecific timothy grass and lepra bacilli. The study is based on the growth of acid-fast bacilli on a synthetic medium composed of chemically pure ingredients of accurate standardization. A chemically pure tuberculin has been produced, and specific reactions have followed the introduction into normal animals of the pure protein substance isolated both from

the bacillus itself and from the medium on which it was grown. An entirely different result has been found from the introduction of a fat fraction from the bacillus into a normal animal. It has been shown that this fraction is a stimulus to the growth of one of the cells of the body, the monocyte in which the tubercle bacillus grows. This cell is stimulated to growth far beyond that of the other cells of which the animal body is made up, and this fact is important biologically beyond its influence in tuberculosis. The polysaccharides of the human tubercle bacillus have been shown to possess a killing power for tuberculous animals and, as every tuberculin contains these polysaccharides, this fact becomes of great importance.—*Research in Tuberculosis, K. Emerson, J. Am. M. Ass., March 15, 1930, xciv, 759.*—*(G. L. L.)*

Patent Medicines in Tuberculosis.—The National Tuberculosis Association has continued to wage a campaign, begun long before the passage of the Food and Drugs Act, against quack medicines of all varieties. To determine the prevalence of the use of patent medicines by patients previous to their admission to a sanatorium, the Association questioned 1,499 such patients in this respect. Two outstanding inferences were drawn from the replies obtained. The first is that much uncertainty exists as to just which medicines are patent; the second, that comparatively few patients now put any faith in the so called "consumption cures." The corrected number of patients who actually used "patent remedies," excluding those who used standard medicine accepted for New and Unofficial Remedies, was 181, or 12 per cent of the entire group. The reported use of consumption cures was greater, relatively, than that of the other unaccepted remedies, comprising 21 per cent of the medicines used. There were 113 instances of the use of some accepted specific remedy, and in more than half of these instances the medicine used was codliver oil alone in an official form. Many patients reported the use of medicines which they would not have taken if they had not been misled by the title. It is very improbable that the general run of patients who do not enter sanatoria use these medicines in lesser degree. Certainly the percentage is large enough to indicate that further education of the public is needed.—*The Use of "Patent Remedies" by Tuberculous Patients, L. R. Williams and A. M. Hill, J. Am. M. Ass., April 26, 1930, xciv, 1292.*—*(G. L. L.)*

Factors in Tuberculosis Mortality.—The steady decline in tuberculosis mortality, accelerated particularly since the war, has led to a widespread feeling that the tuberculosis problem is solved. From statistics in special areas it would appear that we have at our command the means of halving this mortality. Why, therefore, do 45,000 people annually die unnecessarily of a so called preventable disease? There are two main causes: (1) the exposure of susceptible individuals to overwhelming infection and (2) the breaking down of normal resistance in those with slighter infections. The prevention of massive infection is mainly accomplished by segregation of active cases in institutions and, second, by the protection of humans, especially children, from transmission through the milk of tuberculous cattle; third, scrupulous care and personal hygiene on the part of affected individuals. Until there is a generally accepted sentiment that the excretions from the respiratory tract are potential sources of disease, we shall not get far in controlling respiratory illnesses. Cough and expectoration must be checked, especially in homes and places of work and recreation. There are the difficulties of early diagnosis. In sanatoria designed to care for early cases not one-third are actually in an early stage. The insidious and protean nature of the disease is partly responsible, but the astonishing failure of the physician to suspect it is also to blame. The precaution should be taken in all suspicious cases to have a chest roentgenograph. Less reliance should be placed on negative sputum reports and fine points of physical signs and more on the history and the X-ray examination. It seems reasonable to believe that the following measures would reduce tuberculosis mortality by one-half in any community: *1:* Adequate hospitals and sanatoria to which patients would go. *2:* Pasteurization of the milk-supply. *3:* Scrupulous care on the part of patients with the disease. *4:* Better realization of the frequency and earmarks of the disease. *5:* Sharpened faculties on the part of medical men toward suspecting the disease.—*Why Do So Many Die of Tuberculosis, J. A. Miller, New England J. M., July 24, 1930, cciii, 158.*—*(A. P.)*

Tuberculosis in Coal Miners.—General opinion has had a propensity to see differences of a pathological order between certain occupational groups of the population respective to and inherent to their work. Thus there seemed to be a sufficient reason for the lesser frequency of tuberculosis among agricultural than among industrial workmen. One is prone to see the effect of a trade which is accustomed to great muscular activity in the pure open air and the sunshine of the fields, and on the other hand,

sedentary trades which are carried on in the promiscuity of crowded work shops, without sunshine, the air insufficiently renovated and contaminated with dust. But such a manner of outlook seems hardly applicable to the tuberculosis mortality among miners, who physically are roughly comparable to agricultural laborers. But their rough work is accomplished in the bottom of narrow shafts where the sun never penetrates and where the warm humid atmosphere is permanently charged with dust. However, in the eighteenth century Clapier attributed to this atmosphere curative properties toward phthisis, due to sulphurous emanations. In the middle of the nineteenth century several Belgian physicians maintained that the pressure and warmth in the mine had a beneficent influence and even compared it to the Mediterranean climate. Since then ventilation has been improved. Whether there has been a corresponding decline in tuberculosis among miners has not been established. It has not been demonstrated, for example, in England, that ventilation has been perfected, and in fact, there is always much dust, perhaps even more than before, because of employment of machines mechanically perforated, in whose draft the miners work. They are also exposed to sudden temperature changes and a combination of conditions which seems to comprise most of the factors reputed to favor the development of phthisis. Why then should the tuberculosis mortality be low in this group? Some have thought the answer lay in lack of exposure to infection, as the miners usually work in small isolated groups and these are perpetually moving to new places. The dust in the mine surrounds any bacilli expectorated while the humidity keeps them from becoming desiccated and floating in the air. Such reasons evidently satisfied Landouzy and were considered valid by Heymann and Freudenberg. One must consider, however, the time the miners spend outside the mines. Koch believed most infection among workmen to be acquired at home and not in the shop. As to the relative importance of domestic and occupational contact, authors differ considerably. In fact, such controversy may be superfluous when it is considered that most adults who develop tuberculosis do so as a reawakening of an infection received in childhood or adolescence and previously latent. In other words, adult contagion plays an exceptional rôle. Certain physicians have thought there was less tuberculosis in miners than in their families, as Racine and Goldmann in Germany, Trotter in England, and more recently Wainwright and Nichols in Scranton. Their opinion is confirmed by Lynnot and by Alling in Sweden. If such be the case, mining as an occupation would seem to be less predisposed toward tuberculosis than most. *Conditions in Mines:* One of the most striking features is the presence in the atmosphere of a thick suspension of dust incessantly produced. This black dust is only about half carbon, the rest being a more or less argilous schist of sandstone or limestone. Early observers were struck with the intensity of the black coloration of the lungs at necropsy. Gregory first published Christison's analyses of this "black matter," showing it to be carbon, which was later confirmed by others. The technique of analysis, however, has been vigorously criticized by Jousset, who finds much iron present in the pigment. This iron may, of course, be derived from the circulation. But certain coals are rich in iron: from an average of 15 per cent it may reach as high as 75 per cent. To hold as does Jousset, reverting to some of Virchow's views which he later modified, that all black pigmentation of the lungs is due to iron oxide, is illogical, and contravenes the facts. Over 20 French and foreign workers have obtained success with several hundred animals (guinea pigs, rabbits, dogs) by exposing them to the natural inhalation of soot; fine carbon dust, carmine, indigo, etc. Their observations were made immediately after inhalation. Mme. Riembault has seen similar black coloration of the lungs of horses and rats in the mines, and Haynes has shown that the black dust localizes in the subpleural parenchyma, along the vessels and bronchi, and small masses are to be seen in the lymph nodes. Not only the penetration of carbon and other dusts into the lung is to-day undeniable, but a number of details of the mechanism have been elucidated, thanks to the recent studies of Sewell, Carleton, Binet, and others. Lehmann and his pupils found about 50 per cent of the inhaled dust, in animals, arrested with upper respiratory tract, to be rejected with the bronchial mucus, 5 to 15 per cent reaching the pulmonary alveoli, and a considerable proportion the digestive tube. Large phagocytic cells ingest the dust particles and then fall into the alveolar cavity to be eliminated through the bronchi with the mucus. A number, on the other hand, make for the lymph spaces and vessels, then penetrate the perivascular and peribronchial connective tissue. From one dêpot to another they finally make their way to the large glands in the hilum region. Does the presence of this coal dust from the mines in the very heart of the lungs affect the development of tuberculosis? It certainly determines very extensive connective tissue reaction and even, in

some cases, necrosis and cavity-formation. Blood vessels are obliterated. Phthisiform symptoms appear. Gibson, in 1834, was of the opinion that phthisis was modified and masked by anthracosis. In 1884 Tupier concluded that anthracosis was not a specific disease but a fibroid phthisis with lesions marked by carbon. Multiple experiments, however, showed carbon dust unlikely to cause ulceration. We reject the notions held by Luvin, Goldmann and Trotter, that coal dust inhibits tuberculosis, as incompatible with cultural experiments by Wainwright and Nichols, Cluvert and Mavrogordato, Corper and Starry. Still there exists the possibility of a certain absorption of tuberculous toxin by the coal dust. Experiments have been carried out in which there were submitted to inhalation of coal dust animals infected by tubercle bacilli and the development of their disease compared with that of controls. Claisse and Josué found no difference, nor did Cornet and Ranzoni. Bartel and Neumann, also Cesa-Bianchi, thought the presence of coal dust favored the development of tuberculosis. Willis, exposing 22 guinea pigs three hours a day for three to twelve months to coal dust prior to infection, with 8 controls, found the latter, following subcutaneous infection, developed more tubercles but with less extensive pathological changes. Jotten and Arnoldi, using rabbits, found those exposed to sterilized coal dust prior to infection died a little sooner, with more marked lesions. The same was true when a pulmonary immunizing injection was given. However, in the United States, Wainwright and Nichols, and later Corper, Starry and Lurie, obtained opposite results. Wainwright and Nichols used the intratracheal route of infection, Corper, Starry and Lurie the intravenous. Ascher exposed infected animals (rabbits) in a smoky atmosphere and found they died sooner than those in a normal atmosphere. Henius and Richert, on the other hand, found no difference. In all these reported experiments the progress of the dust particles has been most carefully followed from the pulmonary alveoli to the bronchial lymph nodes. Wainwright and Nichols, alone since Charcot, and Arnold, thought they observed a certain connective tissue reaction under the influence of dust. None of the other workers perceived any inflammatory reaction followed by induration or sclerosis, even when the inhalations were continued over twelve months (Willis). Edling states that pure carbon introduced into the lung acts as an inert substance; its action on reaching the connective tissue spaces is a mechanical one; hence the formation of zones of atelectasis, corresponding to the commonly present dyspnoeic symptoms. The contradictory results of Wainwright and Nichols, and Corper, Starry and Lurie, would indicate an inhibiting influence on tuberculosis, but they were obtained on too small a number of animals to counterbalance the weight of the evidence of other investigators, which establish the fact that the lung infiltrated with carbon dust does not increase resistance to tuberculosis and that its only effect is lymphatic obstruction by sclerosis. In none of the above experiments have the actual conditions at the mine, however, been reproduced. In the case of the miner the dust inhalation is continued over many years; also, the dust is not entirely carbon but mixed with that of various rocks. In 1903, Trotter and Oliver, struck by the rôle of silicosis in Cornwall miners, who died in great numbers from tuberculosis, considered the possibility of inhalation of siliceous dust along with coal. Such workmen would have sclerotic lesions ending in necrosis by vascular obliteration. Tuberculosis, although often present in such lungs, was thought by Oliver to be secondary and its progress to be retarded by the fibrous tissue. A little later Collis attempted to show statistically the relation in coal miners between the frequency of respiratory disease, especially pulmonary tuberculosis, and the proportion of siliceous matter mixed with the coal. In England, during the periods 1900–1902 and 1910–1912, the Lancashire miners especially showed high mortality rates from respiratory disease, especially tuberculosis; likewise the Lancashire basin imposes the most work among hard rocks—quartz, granite, silica. Besides, the tuberculosis mortality of the stone cutters in Lancashire exceeds that of any other group, and their average age at death is 42. According to Collis, the high proportion of inhaled silica favors the appearance of tuberculosis but slows its course. The foregoing ideas are open to some objections: first, one ought to make sure that the rocks in Lancashire are markedly different from those of other basins. It is known that the coal mines of Monmouthshire and South Wales offer geological conditions analogous to those of Lancashire, whereas their tuberculosis mortality is widely different. Collis neglects to remark that the phthisical mortality of the entire population of Lancashire is high, while that of Monmouthshire and South Wales is very low. The relations between rock silica in coal mines and frequency of tuberculosis seem better explained by Böhme. He found that roentgenographs taken after inhalation of dust showed accentuation of the bronchovascular ramifications, with streaked or mottled zones due to an agglomeration of small nodules, and

at a more advanced stage shadows of large indurated deposits. Such shadows are met with twice as often in the rock-pickers of Northern France as in the regular coal miners. These workers in hard rock show at a relatively late stage signs and symptoms of pneumokoniosis which however follows more or less the course of a phthisis. Active tuberculosis also is met with twice as often in rock workers as in coal miners. But, in the presence of a tuberculosis associated with silicosis, it may be difficult to determine the origin of sclerotic tissue. Which malady preceded the other, and what influence did each exert on the other? Some, like Watkins—Pitchford, believe the parenchyma to be especially involved by tuberculosis, and that it then tends to accumulate siliceous dust, giving the infection a tendency to induration and chronicity. But most, with Böhme and Tattersal, regard the tuberculosis as secondary and observe that the association with silicosis leads to grave consequences not observed, or rarely, in coal miners. A sclerosis of siliceous origin may differ widely from one of carbonous origin. In the coal-pits the proportion of workmen exposed to siliceous dust in any quantity is small, about 3 to 4 per cent, and all these do not get silicosis. The individual element enters into play. Besides, it takes as a rule ten years for the first roentgenographic signs of disease to appear. Most of the men abandon this rock-picking within a few years to become regular miners and the admixture of coal dust seems to retard the development of pronounced silicosis. Mavrogordato's experiments with guinea pigs are referred to, in which he found that accumulations of siliceous dust were better eliminated in the presence of coal dust, but not vice versa. His work was also confirmed by Carleton. *Conditions in the Mines:* It must always be remembered that miners come under the influence of other material conditions than those of their actual work,—food, lodging, sanitation, recreation, which make up a "level of existence." This, in turn, influences the development and course of such a disease as tuberculosis. European and American adults are to be considered as possessing a relative amount of acquired immunity to tuberculosis, acquired by specific contact and slight infection, which remains latent unless something breaks the equilibrium of the organism, when clinical tuberculosis begins. Numerous and important statistics have shown that social groups may be classified according to general mortality, and still more according to tuberculosis mortality, with reference to their level of existence. Thus the commonly recognized social nature of tuberculosis. To illustrate this, tables are shown giving the general and tuberculosis mortalities from 1890 to 1923 among the general population, among coal miners, agricultural workers, and blacksmiths. In England, from 1890 to 1914 both the general and phthisical mortality progressively waned, the latter faster than the former. From 1921–1923 this movement was less pronounced because of difficulties brought on by the war and in the case of miners the phthisical mortality rose. Now general conditions of life among miners are probably about on the level with those among blacksmiths, while among agricultural workers they are probably poorer. The experiences of the Great War showed the importance of alimentation in maintaining resistance against latent tuberculous infection. Post-war experience showed lodging to be much less important. Overcrowding was rife and lodging mediocre, yet tuberculosis mortality did not suffer. Another factor to consider among miners is that of physical selection. Those who lack vigor do not last in this occupation. Moreover, for some time quite a severe medical examination has been required of recruits. It is true that this has not always existed nor can too much be expected of it, and also that in every country this trade is apt to be handed down from father to son. Finally, it seems that quite good general living conditions, and physical selection, both natural and organized, play an important part in the low frequency of tuberculosis among miners. The same opinion has been arrived at by Lindemann, Heymann and Freudenberg, and is generally held by German authors. In South Africa the physicians of the coal pits, also of the gold mines, have been able to reduce enormously the losses in personnel due to pulmonary tuberculosis, by amelioration of living conditions plus medical selection of personnel. *Conclusions:* Pulmonary tuberculosis is relatively uncommon among coal miners, the mortality due to it being from one-half to two-thirds of that generally found for corresponding ages. Coal dust mixed with some rock dust which floats in the atmosphere of the mines penetrates to the pulmonary parenchyma and gives it a black color. But the coal provokes no inflammatory reaction ending in fibrosis; neither does it possess any antiseptic power toward tubercle bacilli. It has no influence on the development of tuberculosis. However, it may prevent accumulation of silica dust, which produces sclerosis and favors tuberculosis. Outside their work, coal miners enjoy generally favorable conditions of life which tend to maintain resistance to latent infection. The preventive effect of these

conditions is enhanced by physical selection. —*La Tuberculosechez les mineurs de charbon, E. Arnould, Rev. Belge d l Tuberc., September-October, 1929, xx, 193.*—(*A. P.*)

Factors in Decline of Tuberculosis.—The author reviews and summarizes the literature dealing with a study of the factors which have been most influential in the decrease in the tuberculosis death-rate. Just as clinical tuberculosis is a disease of protean manifestations, so also the factors involved in its decline are numerous, but they may be conveniently grouped under three headings. Other things being equal, it is becoming increasingly apparent that the death-rate varies directly with the number and virulence of tubercle bacilli, and the number of susceptible persons in a population, inversely with the degree of physical well-being of individuals, and also inversely with the amount of employment of good medical and public-health facilities in a population. The number of tubercle bacilli present will obviously depend on the presence of uncontrolled human or bovine cases, recognized or unrecognized. Variations in virulence of different strains of tubercle bacilli have been demonstrated *in vitro* and may exist *in vivo*. The number of susceptibles will depend on the number who have never been host to the tubercle bacillus, those suddenly exposed to enormous numbers of bacilli, those who are physically under par and unable to withstand invasion, and those in whom former small areas of disease have so completely healed that their antibodies have disappeared. The employment of good medical and public-health facilities includes competent medical care within the reach of all classes, the possession of enough knowledge by all classes to cause prompt and continuous employment of such facilities, early detection and proper isolation of infectious cases, and knowledge and practice of good personal hygiene. Each of the three factors first enumerated operates independently of the other in a given population, and each may become dominant temporarily only to be replaced later by another.—*A Review of Factors Involved in the Decline of Tuberculosis, W. P. Shepard, J. Am. M. Ass., March 8, 1930, xciv, 697.*—(*G. L. L.*)

Tuberculosis Surveys.—General public health surveys are well known. Horwood has also developed a modified survey, adapted particularly to tuberculosis work, and has carried out such surveys in Philadelphia, Boston, Cambridge and Holyoke. Sufficient time has now elapsed to evaluate their effectiveness. *1: Changes Effected:* In one case the tuberculosis-clinic service of a large city was transferred from the State Department of Public Health to a Division of Tuberculosis in the local health department, created especially. The local tuberculosis association was reorganized, placed under capable direction and an extensive community health program instituted. In another city the survey was responsible for establishing a division of tuberculosis in the local health department; for transferring control of the local tuberculosis hospital to municipal hospital supervision, for decentralizing the clinic service and adding more clinics and for disclosing the existence of a serious problem among the negro and Irish residents and among young women from 15 to 30. A whole chain of activities to correct these conditions was initiated. In a third community medical inspection was improved, and the local board of health is urging the adoption of health centres in school buildings. In all these surveys the communities were well organized, publicity was good and the work was performed with the consent and coöperation of local and state health departments. All factors bearing on tuberculosis prevalence and mortality were considered broadly. In fact, tuberculosis lends itself as a splendid means for ascertaining community health conditions and the adequateness and completeness of reporting and handling vital statistics, which are usually quite faulty. Requests for surveys almost always come from a voluntary health group, such as a tuberculosis association and are paid for by them. Such groups are more active, more critical, and more idealistic than local health agencies. The end-results, however, benefit the latter. Tuberculosis surveys are more economical than general health surveys and yet in many respects are as broad. Besides, the tuberculosis problem is still the outstanding unsolved one among us. Though tuberculosis now stands seventh or eighth in the list of causes of death, it ranks first among young adults from 15 to 45. It is also most closely linked to general social and economic conditions and to personal hygiene.—*The Value of the Tuberculosis Survey in Promoting the Public Health, M. P. Horwood, New England J. M., June 12, 1930, ccii, 1147.*—(*A. P.*)

Tuberculosis Control. It is an easy matter to assemble a catalogue of the policies and practices pursued by the National Tuberculosis Association since its inauguration in 1904, but a very different matter to appraise their effectiveness. Twenty-five years ago the tuberculosis death-rate in the United States was 200 per 100,000. To-day for the 1928 Registration Area it is 79.2. A

quarter of a century ago there were 113 sanatoria in the United States with 9,000 beds. To-day there are over 618 with 73,695 beds and many newly projected institutions under construction. In view of its undeniable advantages both for training the tuberculous sick and for effectively treating them, we may assume it to be a permanent institution. *Changes in Sanatoria:* In the early days and even recently, isolated localities have been chosen for their location. This plan has serious disadvantages, many patients objecting to going far from home and leaving prematurely. A second consideration is economy and for a good many years the National Tuberculosis Association has advocated tuberculosis wards in general hospitals, especially in the smaller cities and rural areas. Third and most important is the fact that by their distance from medical teaching centres opportunity for instruction of students and physicians is missed. This lack is now being recognized. Chicago University is adding tuberculosis beds to its medical-school hospital. Syracuse is putting internes in the Municipal Hospital, and Yale has arranged with the William Wirt Winchester Hospital to have all undergraduate medical students instructed there, within the city limits of New Haven. *Preventive Measures and Child Protection:* General preventive measures include case-finding, breaking contacts, preventoria, open-air schools, and many other projects. Probably far more work will henceforth be devoted to the development of the preventorium type of care. Whether Calmette's *BCG* vaccine will figure as an important element is uncertain. It might prove of real service under special conditions or when the epidemic type of the disease seemed most evident. Institutional preventoria, to take the child out of unfavorable surroundings and break contact, may still be needed for a long time, yet there are obvious disadvantages in removing many children from their homes, and more economical solutions may arise. So called open-air schools seem likely to be much increased, together with raised minimal requirements for all schools. Child health education began as a part of the public-school system only about a dozen years ago and has developed rapidly, so much so as to be now rather in a chaotic state. Whence the necessary material shall come and how be administered must be carefully worked out. General publicity, with increasing use of the radio, and directed more toward the adult public, must also be further developed and guided. *Future Program and Problems:* A review of our actual knowledge of the life-cycle of the bacillus, of the effect of economic influences on the disease, of its methods of propagation, transmission and racial specificity, shows it sadly limited. Hence a Future Program Committee, with the advice of distinguished statisticians, public-health students and administrators, is formulating an extensive epidemiological study and it has recommended that a skilled epidemiologist be added to the staff of the National Tuberculosis Association, as well as that better provision be made for training men equipped to carry on such researches. No one can yet accurately appraise the resistance against the disease assumed to be produced by the initial or childhood type of infection and further studies of blood and other antibodies are needed. Also, the causes of the racial incidence and variation of the disease remain to be determined. *After-Care and Rehabilitation:* This has been well called the third stage in treatment, to which until lately sanatoria have paid but scanty attention and public-health departments actual indifference, while society and industry have given but little coöperation. Sheltered workshops such as the Altro in New York, the Potts Memorial at Livingston, New York, and the Papworth Industrial Village in England, are experimental enterprises in this direction. However, the vast bulk of arrested or quiescent cases must be cared for by their own communities. In the first place, patients should be kept in sanatoria until it is reasonably safe for them to return and undertake some sort of work. Cases not benefited by treatment must be looked on as permanently unproductive invalids. Every discharged case should be transferred to the public-health records of this community and receive thorough, not perfunctory, supervision. The burden of the arrested industrial case ought to fall on industry, as it will not affect over one or two per cent of the personnel. Further social research and testing of plans is also needed here.—*Where Are We Going in Tuberculosis Control?, K. Emerson, New England J. M., May 29, 1930, ccii, 1039.*—*(A. P.)*

Tuberculosis Control in Chicago.—The World War and the new basis of immi gration quotas introduced in 1924 curtailed, to a considerable degree, immigration into the United States, and this in turn restricted the usual flow of cheap labor necessary to American industry. Industry found a solution by creating within the boundaries of the United States a new migration from the country to urban industrial centres, which affected the negro race especially. Their transplantation from sparsely settled Southern communities and indolent plantation life to the hard labor of highly tuberculized

and congested communities created a serious health problem and halted the consistent downward trend of tuberculosis mortality. The negro population of Chicago increased from 30,000 in 1900 to over 170,000 in 1928. In 1929 their tuberculosis mortality was 404.5 per 100,000, as against 57.5 for whites, or seven times as high. Another factor affecting tuberculosis mortality was the change in the current conception of womanly grace and figure, resulting in insufficient dietaries, productive of a susceptibility, which allows ubiquitous tuberculous infection to develop into active disease. *Tuberculous Legislation:* Prior to this first active step, the field must be prepared, and this is well done by voluntary private organizations, such as the Chicago Tuberculosis Institute. In Chicago the particular enabling act is known as the Glackin Act. This gives to residents of cities or villages in Illinois the right to determine by referendum whether they will permit a special tax levy for tuberculosis work, prevention and treatment. In Chicago the tax rate is 0.6 mills per dollar valuation of real property and nets over two million dollars a year. The Act also outlines the necessary organization, a board of three directors, of whom one is a member of the board of health, and this board is given very wide powers. It may enact the necessary coercive measures to make its work effective with recalcitrant elements of the citizenry. In 1908 tuberculosis was first made reportable in Chicago. That year 2,577 new cases were reported and 3,915 deaths. In 1929 there were reported 6,540 new cases and 2,550 deaths. Also, in 1918, a hearing board was established, to which physicians failing to report cases were called to account. Over a period of four years this board had before it 1,586 physicians for explanation, education, and, in rare cases, discipline. Three cases were prosecuted and convicted. *Tuberculosis Organization:*—In the modern structure there are essentially two units,—the sanatorium proper and the field unit, both under control of the board of directors, who are in a position to dictate a unified plan and coördinate functions and activities. There are 8 dispensaries, each under the supervision of a head physician and head nurse and staffed by a personnel of either two full time physicians or one full time and two part time, and with a nursing complement of 24. These are open from 9 A. M. to 5 P. M. and from 7 to 9 P. M., and are located in congested districts where tuberculosis is prevalent. It is emphasized that tuberculosis control in a large community is a full-time job and one based on other premises must eventually miscarry. Private physicians, on reporting cases, are sent letters of information, also stating that a nurse will visit the home at intervals. On receipt of death-reports a letter is sent, calling attention to the importance of examining contacts. Consultation service is offered free, also X-ray and fluoroscopic service for those unable to pay private fees for it. The tuberculosis nurse should be exclusively such. In fact, a tuberculosis organization cannot function effectively as a subsidiary of another health agency. *Prophylaxis and Control:* Chicago has 61 open-window schoolrooms, with an enrollment of 1,830 children. Further to limit contact, a state regulation was enacted in 1918 according to which no child under 16 years shall live in the same abode as a person suffering from active or open pulmonary tuberculosis. This provision is enforced in all cases reported, so that on December 31, 1929, of 3,051 open cases on the books, only 23 were actually in contact with children and these were in process of clearance. The friendly adjustment method of segregation has proved effective in 95 per cent of cases. Forcible hospitalization has been employed in a few cases. Home treatment is now receiving increasingly careful attention by the field-staff. At one of the dispensaries a pneumothorax clinic is maintained for discharged sanatorium patients needing refills. *The Sanatorium:* This has undergone a metamorphosis in recent years, with increasingly active specialistic service and adequate consulting staff with teaching connections. Research by both clinical and laboratory staffs should be encouraged, also systematic medical and lay instruction. A School of Tuberculosis and a rotating district clinic have been established in Chicago. Periodic publicity releases are necessary, also more accurate and carefully kept statistics.—*Present Needs in Tuberculosis Control, B. Goldberg, New England J. M., April 17, 1930, ccii, 761.*—(*A. P.*)

Progress in Tuberculosis Control.—Twenty years ago, within a few months of each other, were opened the North Reading, Lakeville and Westfield State Sanatoria. Each cost $100,000 for land, buildings and equipment, and provided 150 beds, an approximate cost of $750 per bed. This was modest when contrasted with present construction costs of $7,000 to $10,000 per bed. In those days we were satisfied with large open wards and frame construction. Modern sanatoria are of the hospital type and fireproof, with many single and double rooms and no large wards. The three sanatoria of 1910 were all planned for adults with pulmonary tuberculosis; now two are used for tuberculous children and one for

bone and joint tuberculosis. The first state sanatorium in the United States was built in Rutland, Massachusetts, in 1898, largely as a result of Bowditch's efforts and his establishment of the Sharon Sanatorium. Now in 1930 there are nearly 700 institutions for the tuberculous in the country with an aggregate capacity of about 70,000 beds. The outstanding developments since North Reading was opened have been (1) the recognition of the value of bed-rest, (2) the utilization of pneumothorax and thoracic surgery to apply additional pulmonary rest, and (3) the use of heliotherapy as an adjunct. In diagnosis the use of the X-ray has made possible the recognition of the childhood type of tuberculosis and has furnished a means of determining extent, progression or retrogression. Vital statistics show that tuberculosis causes more deaths in children than any other communicable disease. Tuberculosis has been reportable in Massachusetts since 1907. Of its carriers, some are ill, others have few symptoms, yet may harbor a walled-off lung cavity which serves as a living culture-tube from which virulent bacilli are thrown off to infect relatives and friends. It may be a matter of years before the results of such exposure are manifest. So far we have applied but little of what we know about tuberculosis. In 1910, 6,054 persons died in Massachusetts of all forms of the disease, while in 1929 the deaths totalled 2,922, a gratifying reduction of about 48 per cent, but not brilliant compared with the 90 per cent reduction in typhoid-fever mortality. Carriers of the disease must be found and isolated and then the effects of poverty, overcrowding and malnutrition minimized. A case of tuberculosis is the outcropping of a vein of disease with concealed ramifications. In Detroit the name of every reported case is given to a nurse assigned to that district. It is her duty to call on the doctor and with his permission visit the home to give instruction and nursing service if required. She is expected to do everything possible to induce all members of the household to be examined. Physicians are also informed that they may send their patients and contacts to the Health Department Clinic for X-ray if the family can not pay for the usual services. Reports of all cases so referred are sent back. Children under 15 are tuberculin tested and reactors X-rayed. Others are X-rayed regardless of symptoms or signs. About 2,200 children in the open-air and open-window schools have been tuberculin tested and the reactors X-rayed. Those with evidence of tuberculosis are kept under supervision or hospitalized; often others of the family are drawn in for examination. Massachusetts has a wonderful opportunity to become one of the first states to eliminate tuberculosis as a major disease. The negro population is small and there is but little migration from the South. It has more beds per death than any other state. The State Department of Health has been carrying on a case-finding program among school children since 1924 that in scope and thoroughness is not equalled anywhere. Its methods are being adopted in other places, though not yet on a statewide scale. The annual requests for appropriations have been willingly granted by succeeding administrations. The death-rate from all forms of tuberculosis has fallen from 179 in 1910 to 67 in 1929 per 100,000 persons. *Suggestions:* Consider tuberculosis a communicable disease and care for it accordingly. Terminal cases can often be cared for at home when proper segregation is possible, thus leaving sanatorium beds for more favorable cases. Other members of the household must submit to X-ray examination. Tuberculin tests and X-rays may have to be furnished by the Health Department. Sanatorium admission should be by selection: first, those who are the greatest menace at home; second, those most favorable for treatment. X-ray films should be filed with the applications. Tuberculosis is a liability which need not be carried on indefinitely if we make full use of our knowledge.—*Progress in Tuberculosis Control, H. D. Chadwick, New England J. M., July 10, 1930, cciii, 64.*—(*A. P.*)

Antituberculosis Work in Massachusetts.—The Massachusetts Tuberculosis League has carried on its activities for sixteen years, with very little change in personnel. Recently, with the aid of a grant of $1000 from the National Tuberculosis Association, an investigation of high-school health education has been initiated at Lynn, and will continue over a three year period. Also, at the suggestion of the League a tuberculosis and health survey was recently made of the City of Holyoke by Horwood, of the Massachusetts Institute of Technology, and at the request of the Southern Middlesex County Health Association a survey was made of that organization and a program formulated. The League has also been active in the Early Diagnosis Campaign and its staff has rendered assistance to summer health camps and other activities. Turning to general state tuberculosis activities: *1:* In Massachusetts there has been an encouraging decline in the mortality from pulmonary tuberculosis in 73 years from 395 to 58 deaths per 100,000 living. In 1924 a Ten Year Program was inaugurated by the State Department of Public Health to pre-

vent tuberculosis. For five years this was carried on under the direction of Chadwick and later of Wakefield, and valuable data are being compiled. While twenty years ago various studies seemed to indicate almost universal infection by the fourteenth year, now, out of about 100,000 children tested, only 28 per cent react. These figures suggest a significant diminution of infection corresponding to the mortality decline. In detecting tuberculosis in children much more reliance is placed on X-ray than on physical examination. A satisfactory procedure is to do routine tuberculin skin tests and X-ray the reactors. By this procedure tuberculosis in the hilum region is demonstrated in 2.5 per cent of children examined and pulmonary tuberculosis of the adult type in only 0.1 per cent, being two and one-half times as common in girls as boys. The general frequency of pulmonary tuberculosis is uncertain but has been estimated for the state at 25,000, whereas there are only 4,000 beds to care for it. It is also estimated that 25 per cent of untested cattle are tuberculous and that about 70 per cent of the milk is pasteurized. *2:* Preventive measures are applicable and effective to a large degree. Most important is early diagnosis, and to this end all contacts should be examined when the disease is discovered in an individual. Such examinations and follow-up, including X-ray films, are available to all school children under the Ten Year Program without expense and should be welcomed. Children in whom latent tuberculosis exists should be given the preventorium type of treatment, at home or in an institution. A second important factor is the isolation and segregation of bacillary patients. If home conditions are unsuitable an institution is to be preferred. Infants and children should not be allowed to live in the same house, nor should a tuberculous mother nurse her child. Household help should be carefully scrutinized. Tuberculous teachers should not be allowed in the schools. A third factor is the elimination of infection from cattle both by eradicating tuberculosis from herds and by pasteurization of all doubtful milk. *3:* As to treatment, institutional treatment is best unless the home offers unusual facilities Climate is of little consequence, other things being equal. Recognition of the importance of rest and of such special measures as collapse therapy has led to much progress in treating formerly unfavorable or hopeless cases.—*F. T. Lord, President's Address to Massachusetts Tuberculosis League, April 17, 1930, reported in New England J. M., May 22, 1930, ccii, 1002.*—(*A. P.*)

Children's Tuberculosis Program in Massachusetts.—The Chadwick clinics began in the fall of 1924 as the Ten Year Program and involved one of the earliest attempts in the United States to find hilum lymph-node tuberculosis in children on a large scale. The clinics began as "underweight" clinics, but it was soon found that about 40 per cent of hilum infections were in children of normal weight or more. Therefore the procedure was changed to get at all children. From the beginning it was desired to reach the older adolescent boys and girls in the senior high schools but the problems confronting the personnel have been several. The percentage of consents obtained for examination has increased from about 60 to approximately 90 per cent in some instances. But with the high-school students it is the pupils themselves who virtually decide and whose interest must be aroused. About a year ago the plan of procedure was altered so that the Pirquet test is first given. Four or five days later, when these are read, the reactors are X-rayed with portable outfits already set up in centrally located schools. Another day is allowed for X-raying absentees and for retaking questionable films. If a child is not at school when the tests are read the doctor goes to his house to read the arm. Few cases are lost sight of. Two nurses do the advance work and arrange for lectures by the director. He strives in every instance to speak first to the doctors and explain the diagnostic nature of the work, then to the school-teachers and nurses. Finally the high-school students themselves are talked to. Not so high a proportion of this group has been reached as was hoped but more than was expected. Many hilum cases and a few early pulmonary ones are found in the high schools, usually entirely unsuspected. The X-ray films when taken are at once developed and read by Morgan at Westfield State Sanatorium, and his reports are back by the last of the same week. Children whose films show unusual markings receive physical examination and their doctors the films. The procedure for an entire group is completed within two weeks. When the report of the physical examination is received Morgan completes the diagnosis, reports to the parent and refers the child to the care of its doctor. In the first five years of work 101,118 children were examined, and this year over 49,000 will be examined. Over 1,500 children a week can be covered right along. Six small Ford cars are used for the staff and two Ford trucks for the X-ray outfits. Clinic cases are followed up, first by nutrition workers, second by the State

clinic staff who reëxamine and re-Xray all suspect, hilum and pulmonary cases each year. In this way an invaluable amount of material has been accumulated. The Pirquet tests have been found quite satisfactory. No tuberculous lesions have been found in nonreactors although it is recognized that this may occur. On retesting a few years later about 8 per cent of reactors have become negative. Perhaps 4 to 6 per cent can be explained by personal equation of the observer in border-line cases. Most interesting and significant is the number of perfectly clear pulmonary infections giving no symptoms. There should also be mentioned the observations at Saranac Lake and Westfield, showing that 8 per cent of cases of pulmonary tuberculosis had none of the classical signs while 8 per cent of those with such signs showed negative X-ray findings. Within the last five years the interpretation of chest films on children has gained much in accuracy for those who have kept in touch with such work. On the other hand, X-ray men not used to reading chest films in children read into them much not there and overlook things that are present. The question is now being brought up, what after the Ten Year Program? Wakefield believes that this work in which Massachusetts leads the world must be continued.—*Children's Tuberculosis Program in Massachusetts, P. Wakefield, New England Health Inst., Boston, April 18, 1930, New England J. M., July 24, 1930, ccii, 168.*—(*A. P.*)

Child in Campaign against Tuberculosis.—The mortality from tuberculosis in childhood, in Vienna, has been reduced to less than half, comparing the average for the three-year period 1911 to 1914 with that of 1924 to 1927. Based on about 4,000 examinations, the proportion of intraresidential infection to extraresidential infection is as 3 to 2. The acute forms of tuberculosis, such as miliary tuberculosis and meningitis, occur more frequently as a result of intraresidential infection. The infected child leads frequently to the recognition of an otherwise unknown source of infection; this is particularly true of very young children whose extraresidential contacts are negligible. The dispensaries should be notified of all infected children, in order to make a search for the source of infection possible.—*Welche Rolle spielt das Kind in der Tuberkulosebekämpfung?, A. Götzl, Wien. klin. Wchnschr., April 17, 1930, xliii, 498.*—(*M. P.*)

Key to Abstractors

A. P.: Andrew Peters, Pittsfield, Mass.
E. H. K.: E. H. Kerper, Loomis, New York.
F. G. P.: Frank G. Petrik, Loomis, New York.
G. L. L.: George L. Leslie, Howell, Mich.
H. S. W.: H. S. Willis, Northville, Mich.
J. G.: Jacob Goldberg, Loomis, New York.
J. S. W.: J. Stanley Woolley, Loomis, New York.
M. P.: Max Pinner, Tucson, Arizona.
P. J. W.: Park J. White, St. Louis, Mo.
R. M. F.: R. M. Franklin, Loomis, New York.
U. E. Z.: U. E. Zambarano, Providence, R. I.